DETAILED ACTION

Drawings

Figure 2 is objected to under 37 CFR 1.83(a) because they fail to show any details as described in the specification. Specifically, figure 2 is a graph. However, the details are indiscernible as the background and bars are both dark. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 3, 4, 9, 10 and 14 are objected to because of the following informalities: claim 3 recites "whereby part of or the entirety of a SIVsmmPBj14 env gene is deleted". Given that the env gene is encoded by the genome within the recited vector, it would provide clarity to amend the claim to indicate this relationship for example, --wherein the vector comprises a SIVsmmPBj14 genome comprising a deletion in part or all of the env gene--. As well as there is only one env gene, this is more properly indicated by recitation --the env gene--.

In claim 4, the recitation "deletion of the" would be more clear as --deletion in the-- as the recitation deletion of limits the deletion to the entire gene. However, the claim is drawn to a partial deletion of the SU region.

Claim 9 recites "deleting a part of or the entire env gene of a SIVsmmPBj14 virus or a molecular clone thereof". It is customary in the art to refer to the viral particle as a

virus for which it is not clear what is required for a molecular clone. The claim by recitation of deletion of part or all of the *env* gene from the virus or a molecular clone would more accurately be recited as --deleting a part of or the entire *env* gene of a SIVsmmPBj14 viral genome or a molecular clone of the viral genome--.

For completeness, claim 10 should recite --deleting part or all of the *env* gene--.

Claim 14 for completeness should recite --made according to the method--.

Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1 and 2 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The claims, as written, do not sufficiently distinguish over cells that exist naturally because the claims do not particularly point out any non-naturally occurring products. In the absence of the hand of man, the naturally occurring products are considered non-statutory subject matter. *See Diamond v. Chakrabarty*, 447 U.S. 303, 206, USPQ 193 (1980). The claims should be amended to indicate the hand of the inventor , e.g. by insertion of "Isolated" or "Purified"

Claim Rejections - 35 USC § 112, second paragraph

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1 and 9 are vague and indefinite in that the metes and bounds of the term "derived from" are unclear. It is unclear the nature and number of steps required to obtained a "derivative" of a SIVsmmmPBj14 virus . The term implies a number of different steps that may or may not result in a change in the functional characteristics of virus from the source that it is "derived from". The dependent claims are included in the rejection because they fail address or clarify the basis of the rejection as discussed in detail for the independent claims.

Claims 1 and 9 recite "the virus" whereas there are two recitation of a virus in the base claims. It is unclear to which of these two recitations the claims refer.

Claims 15-17 provides for the use of a vector, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 15-17 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd.* v. *Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966). These claims lack clarity for consideration under art and enablement issues and as such have not been further considered.

Claim Rejections - 35 USC § 112, first paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-14 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a recombinant SIVsmmmPBj14 or SIVsmmPBj1.9 virus, or for a method of making pseudotyped vectors from comprising these viruses in which the SIVsmmPBj14 virus envelope gene is deleted such that the env protein is non-functional, does not reasonably provide enablement for any other embodiment. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims.

The test of enablement is whether one skilled in the art could make and use the claimed invention from the disclosures in the patent coupled with information known in the art without undue experimentation (*United States v. Telectronics, Inc.*, 8 USPQ2d 1217 (Fed. Cir. 1988)). Whether undue experimentation is required is not based on a single factor but is rather a conclusion reached by weighing many factors (See *Ex parte Forman*, 230 USPQ 546 (Bd. Pat. App. & Inter, 1986) and In *re Wands*, 8USPQ2d 1400 (Fed. Cir. 1988); these factors include the following:

The instant claims are drawn to a retrovirus vector capable if transducing cells in a Go phase and further in G1 cells. The vectors are derived from SIVsmmPBj14 virus. As well, the vector can be pseudotyped in which envelope protein of the virus is replaced

with that from an alternative species. The scope of the invention is extremely broad in that the vector can ultimately be any virus given the unclear nature and number of steps required to obtained a "derivative" of a SIVsmmmPBj14 virus. There are a number of different steps used that may or may not result in a change in the functional characteristics of virus from the source that it is "derived from".

The specification teaches that SIVsmmmPBj14 virus were isolated from Sooty Mangabey monkeys and were found to be capable of replicating in non-stimulated primary human lymphocytes in the G0 phase. Applicants generated a recombinant SIVsmmmPBj14 virus comprising a VSV-G env protein and tested the ability of this vector to infect a variety of human cell lines arrested at G0 and G1. Applicants demonstrate that these viruses can transducer both with greater efficiency then MLV or HIV.

The MPEP teaches, "However, claims reading on significant numbers of inoperative embodiments would render claims non-enabled when the specification does not clearly identify the operative embodiments and undue experimentation is involved in determining those that are operative. Atlas Powder Co. v. E.I. duPont de Nemours & Co., 750 F.2d 1569, 1577, 224 USPQ 409, 414 (Fed. Cir. 1984); In re Cook, 439 F.2d 730, 735, 169 USPQ 298, 302 (CCPA 1971). (see MPEP 2164.08(b). First, applicants' claims are drawn to a vector derived from SIVsmmmPBj14 virus. Derived simply means that one can lead to another. As there are not structural or functional requirements virtually any virus can meet the limitations of the claims. Hence, applicants claim a large and diverse group of viruses. Functionally, the virus must be able to infect cells that are stationary or in the G0 phase. However, applicants have not provided the structural

requirements of the virus such that a nexus between structure and function can be determined. Hence a person of skill in the art would conclude that it would require undue experimentation to identify the recited viruses.

Secondly, applicants recite a method of producing a pseudotyped virus in which the envelope gene is deleted partially or in while. This is a broad group of deletions as the deletion can be as small as two dinucleotides. However, applicants teach complementation of the deletion by co-transfection of cells with a separate plasmid encoding an env gene from another species of viruses. In this way a pseudotyped vector is constructed. As the final vector is pseudotyped, the virus does not express the endogenous env protein but rather comprise an env protein from a distinct virus.

The invention recites use of a broad genus of viruses. Given the unpredictability of the art, the poorly developed state of the art with regard to predicting the structural/ functional characteristics of viruses derived from SIVsmmmPBj14 virus as well as env deletions for pseudotyping, the lack of adequate working examples and the lack of guidance provided by applicants, the skilled artisan would have to have conducted undue, unpredictable experimentation to practice the claimed invention.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U:S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1; 2, 5, 7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by Verma et al (6,013,516; see entire document).

Verma et al teach a recombinant retrovirus capable of infecting cell in G_0 phase as recited in claim 1 (see e.g. figure 5). The claims are directed to a vector derived from SIVsmmPBj14 viruses. Absent evidence to the contrary, the HIV of Verma et al could be derived from SIVsmmPBj14 viruses. Hence the envelope protein is not from SIVsmmPBj14 viruses as recited in claim 6 but is from HIV as recited in claim 7. As well, the virus infects cells as G1 as recited in claim 2 (see e.g. figure 4). Verma et al teach a method of producing the virus by infecting a suitable host with two vectors, the first an expression construct for an env protein from a virus other then SIVsmmPbj14 such as VSV (see col 4 line 19-45) and another lacking an env gene from HIV to generate a pseudo typed vector as recited in claim 8.

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by McClure et al (5,212,084; see entire document).

McClure et al teach SIVsmmPBj14 that inherently can infect cells as Go and G1.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria B. Marvich, PhD whose telephone number is (571)-272-0774. The examiner can normally be reached on M-F (7:00-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Woitach, PhD can be reached on (571)-272-0739. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner
Art Unit 1633